Advances enable better long-range guidance

14 September 2012 - New research published today suggests the Met Office has made steps forward in providing improved long-range guidance for winters.

The study , published in the journal *Environmental Research Letters*, compares the latest Met Office long-range forecast system to the one previously used and shows it can better warn the UK of extreme winter weather conditions.

David Fereday, lead author of the study, said: "This research demonstrates our investment in science is yielding results, but this is just one incremental step in our ongoing effort to improve long-range weather forecasts.

"In itself it's not the silver bullet for long-range forecasting - there is still much more research to be done in this developing area of meteorology, and we're continuing our work to stay at the forefront of that."

The new model, dubbed the "high top" system, is different from the previous system as it takes into account something known as sudden stratospheric warming's (SSWs) - which have previously been shown to be responsible for cold conditions at ground level.

SSWs happen when the usual westerly winds in the stratosphere, between 10km and 50km up, break down and ultimately reverse.

This signal often then burrows down to the Earth's surface over the course of a few weeks, reducing the westerly winds that bring mild air from the Atlantic to northern Europe in winter.

Instead, northern Europe experiences cold conditions that can cause extreme low temperatures, as happened in the 2009/10 winter.

The Met Office's current long-range forecasting system, GloSea4, is able to simulate weather conditions in higher parts of the atmosphere. This was not a feature available in the forecast system used for the 2009/10 long-range outlook.

In the study, the researchers compared the forecasts made during the 2009/10 winter with the old low-top model, to retrospective forecasts with the high-top model. The forecasts started on dates in October and November and predicted conditions from December to February.

The high-top model predicted conditions that were more closely matched to the observed severe conditions in 2009-10, especially in the late winter.

The high top version of the GloSea4 forecasting system has been in operation since late 2010 and provided useful guidance to weather forecasters in the following two winters (2010/11 and 2011/12).

Co-author of the study, Jeff Knight, said: "The inclusion of the high top model is one of a series of planned improvements to long range forecasts."

You can read more about SSWs and cold weather in the UK on the Met Office blog .

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